

New Solvent for Cottonseed Oil Processing

Consider cottonseed oil. It fries the humble potato chip, an American picnic classic. Summer sunbathers glisten with tanning oil made from it.

Cottonseed was the first major vegetable oil used in the United States. In the 19th century, hydraulic presses were used to remove the oil. Later, continuous screw-type presses offered more efficiency. The shortage of oil for soaps, food, and explosives during World War I prompted the use of petroleum-based solvents to get more oil from the seeds.

Now a scientist with the Agricultural Research Service may have found a more efficient way to meet industry's needs. The key: switching from hexane, the current oil removing solvent, to isohexane, which has several benefits.

"We found that substituting isohexane for hexane in production required little or no change in the cottonseed crushing operation," says chemical engineer Peter J. Wan. "We tested isohexane in plants operating at full capacity and saw both savings in energy and more product produced per hour."

Scientists at ARS began to study alternative solvents during the energy crisis of the 1970's.

At first, their goal was to find more effective solvents, such as acetone, to remove oil and undesirable pigments. Later, renewable solvents that didn't rely on petroleum sources became the focus. But the ideal candidate—ethanol—proved too costly.

During the 1980's and 1990's the focus switched to achieving cleaner, safer, and cost-effective production, so the search for alternative solvents continued.

A research team led by Wan decided to give isohexane a try. The National Cottonseed Products

Association also supported him, and some of its members offered their mills to test the new solvent.

"Our experience with isohexane was positive. We saw good extraction and some energy savings," says Billy Clark, president of Yazoo Valley Mill in Greenwood, Mississippi.

"We even reran the test to confirm results. We had no trouble getting isohexane from the supplier for that second test."

"Cottonseed processors have always been industry leaders," says David Kinard, director of research and education for the century-old National Cottonseed Products Association. "Alternative production methods that increase efficiency are appreciated by everyone."

The cottonseed industry represents a billion-dollar U.S. market, says Wan. Each year, 1.4 billion pounds

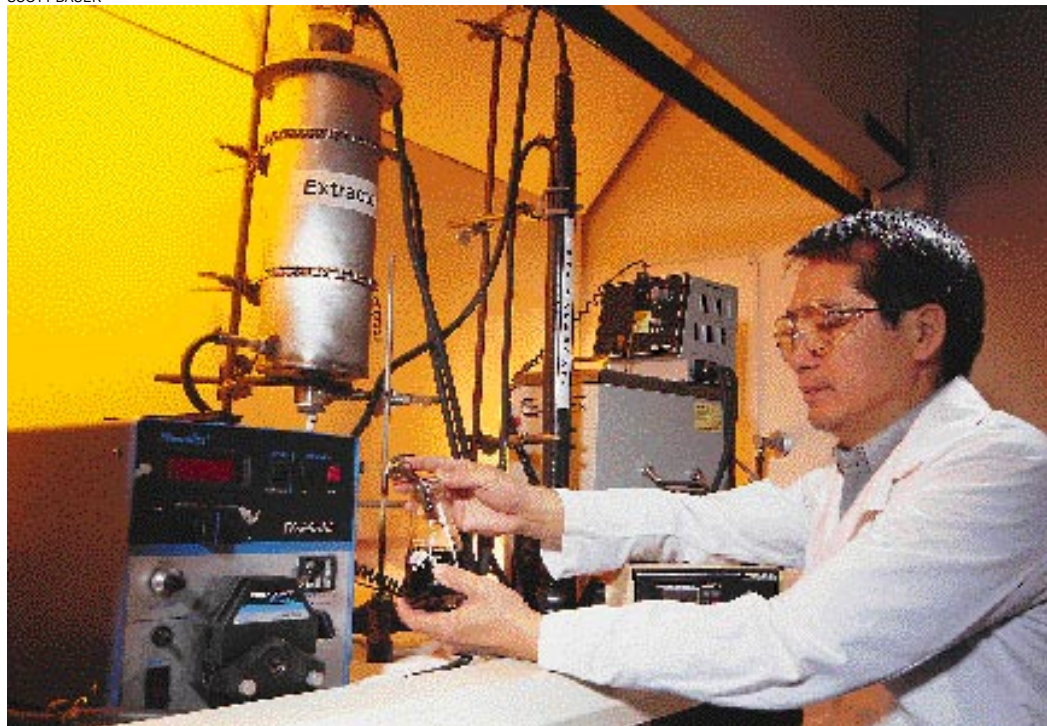
of cottonseed oil are consumed, and their main use is in snack-making.

"Cottonseed oil is considered the 'gold standard' for frying potato chips," says Scott Sanford, who is with the USDA's Economic Research Service. "It's also replacing animal fat in some fast-food restaurants."

"Provided isohexane is economically priced, any oilseed processor could benefit from using it," says Wan. "For example, they'd save energy, because it takes less steam to recover isohexane from the meal and oil during processing."—
By **Jill Lee**, ARS.

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Chemical engineer Peter Wan takes a sample to see how well isohexane compares to other hydrocarbon solvents in removing vegetable oil from meal. (K7287-17)